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COURSE BROCHURE

Renewable and Alternative Energy Technology Selection Training Course

23 May – 3 June 2027
Muscat

Renewable and Alternative Energy Technology Selection Training Course

Ref: 670_25004 **Date:** 23 May – 3 June 2027 **Location:** Muscat **Fees:** 11700 GBP

Renewable and Alternative Energy Technology Selection is a 2-week training course for energy engineers, project developers and capacity planners who must choose between solar PV, wind, hydro, biomass, geothermal, hydrogen and storage, and it ends with a Technology Selection Matrix for a real site. Falling equipment costs, tighter grid connection rules and investor scrutiny make the choice of technology mix a board-level decision. The course is delivered by Jupiter Prime Training.

Why Renewable and Alternative Energy Technology Selection Matters Now

Three forces shape renewable and alternative energy technology selection today. Utilities and industrial buyers want firm, low-carbon supply rather than cheap daytime energy alone; grid operators demand that inverter-based resources ride through faults and support voltage; and lenders test resource estimates and yield assumptions far harder than before. An organisation that picks the right mix gains bankable projects, lower curtailment and a connection that passes first time. One that picks badly strands capital in plant that the grid cannot absorb. The course rests on the levelised cost of energy LCOE model, probabilistic yield estimates P50 and P90 and grid code compliance studies for inverter-based resources IBR.

Who Gains Most from Renewable and Alternative Energy Technology Selection

- Engineers responsible for resource measurement, energy yield and plant layout studies
- Developers responsible for site screening, land, permits and the investment case
- Planners responsible for generation expansion and long-term capacity balance
- Grid connection specialists responsible for interconnection studies and hosting capacity
- Asset owners responsible for storage dispatch, hybrid operation and plant performance

Utility planning units and independent power developers gain most when engineers and commercial leads attend together and test the same site from both angles.

Renewable and Alternative Energy Technology Selection Capabilities

Participants leave able to compare generation and storage options on resource, cost, grid behaviour and risk, and to defend the chosen mix.

- Assess solar irradiance, wind speed, hydrological flow and geothermal gradient data — site screening and resource confidence
- Calculate levelised cost of energy and storage for competing options — investment committee approval
- Weigh firm, variable and dispatchable technologies against demand profiles — capacity planning decisions
- Specify battery, pumped hydro and hydrogen storage duration and size — hybrid plant configuration
- Test inverter-based plant against grid connection performance requirements — network operator acceptance
- Communicate technology trade-offs with a scored selection matrix — lenders, boards and offtakers

Key Renewable and Alternative Energy Technology Selection Terms

- Capacity Factor — The ratio of actual energy produced over a period to the energy a plant would produce at full rated output.
- Levelised Cost of Energy LCOE — Lifetime cost of a plant divided by its lifetime energy output, used to compare generation options.
- P50 and P90 Yield — Annual energy estimates with a 50 per cent and a 90 per cent chance of being exceeded.
- Hosting Capacity — The amount of new generation a network point can accept without breaching voltage, thermal or protection limits.
- Electrolyser — Equipment that splits water into hydrogen and oxygen using electricity, linking renewable power to hydrogen supply.
- Round-Trip Efficiency — The share of energy put into storage that is returned to the grid after charging and discharging.

Renewable and Alternative Energy Technology Selection Day by Day

Day 1: The Energy Transition Context

- Global Generation Mix Trends — Where Each Technology Fits Today
- Demand Profile Analysis — Matching Supply Shape to Load
- Firm Versus Variable Supply — Reliability Expectations of Offtakers
- Decarbonisation Targets of Buyers — Drivers for Technology Choice
- Technology Readiness Levels — Separating Mature From Emerging Options

Day 2: Solar PV Resource and Plant Design

- Irradiance Datasets and Ground Measurement — Bankable Solar Resource
- Fixed Tilt Versus Single-Axis Trackers — Yield Against Capital Cost
- Bifacial Modules and Soiling Losses — Desert and Rooftop Sites
- DC to AC Ratio Selection — Inverter Clipping and Energy Gain
- PV Yield Simulation Outputs — Inputs to Financial Modelling

Day 3: Wind Resource and Turbine Selection

- Met Mast and Lidar Campaigns — Confidence in Wind Speed Data
- Weibull Distribution and Shear — Hub Height Choice
- Turbine Class and Power Curve Matching — Site Suitability
- Wake Loss Modelling — Array Layout and Spacing
- Onshore Versus Offshore Constraints — Logistics and Cost Exposure

Day 4: Hydro, Biomass and Geothermal Options

- Flow Duration Curves and Head — Run-of-River and Reservoir Sizing
- Biomass Feedstock Supply Chains — Fuel Security and Sustainability
- Waste-to-Energy and Biogas Plants — Municipal and Agricultural Sources
- Geothermal Gradient and Well Testing — Exploration Risk
- Binary Cycle Versus Flash Plants — Matching Reservoir Temperature

Day 5: Hydrogen and Alternative Fuels

- Alkaline and PEM Electrolysers — Efficiency, Flexibility and Stack Life
- Green Hydrogen Cost Drivers — Power Price and Utilisation
- Ammonia and Synthetic Fuels — Export and Industrial Use Cases
- Hydrogen Storage and Transport — Pipeline, Tank and Carrier Choices
- Fuel Cells and Hydrogen Turbines — Reconversion to Power

Day 6: Energy Storage Technologies

- Lithium-Ion and Flow Batteries — Duration and Degradation Trade-Offs
- Pumped Hydro and Compressed Air — Long-Duration Storage Roles
- Thermal Storage With Concentrated Solar — Evening Dispatch
- Storage Sizing by Duration — Energy Shifting Versus Ancillary Services
- Round-Trip Efficiency and Cycling — Lifetime Revenue Effects

Day 7: Grid Integration of Inverter-Based Resources

- Hosting Capacity Studies — Selecting Viable Connection Points
- Grid Code Fault Ride-Through — Inverter Performance Requirements
- Reactive Power and Voltage Control — Plant Controller Settings
- Curtailment Risk Modelling — Congested Network Areas
- Forecasting Solar and Wind Output — Scheduling and Balancing

Day 8: Project Economics and Bankability

- LCOE and Levelised Cost of Storage — Comparing Unlike Technologies
- P50 and P90 Energy Estimates — Debt Sizing by Lenders
- Power Purchase Agreement Structures — Revenue Certainty
- Capital and Operating Cost Benchmarks — Budget Realism
- Sensitivity and Scenario Analysis — Investment Committee Confidence

Day 9: Hybrid Plants and Multi-Criteria Choice

- Solar, Wind and Storage Hybrids — Shared Connection Capacity
- Capacity Expansion Modelling — Least-Cost Portfolio Mix
- Multi-Criteria Decision Analysis — Weighting Cost, Risk and Land
- Environmental and Social Screening — Permitting Exposure
- Technology Risk Registers — Supplier and Performance Uncertainty

Day 10: Practising the Technology Selection Matrix

- Site Resource Synthesis — Applying Solar, Wind and Hydro Assessments
- Storage and Hydrogen Option Fit — Applying Sizing Methods
- Grid Connection Screening — Applying Hosting Capacity Results
- Economic Ranking of Shortlisted Mixes — Applying LCOE Comparisons
- Technology Selection Matrix — Scored Recommendation for the Board

Applying Renewable and Alternative Energy Technology Selection After the Course

- Run a resource and hosting capacity screen on one candidate site and rank solar, wind and storage options by LCOE.
- Lead a multi-criteria scoring session with engineering and commercial colleagues to agree weights for the next portfolio decision.

Renewable and Alternative Energy Technology Selection Questions FAQ

What is renewable and alternative energy technology selection and why does it matter now?

It is the structured choice of generation and storage technologies for a site or portfolio. It matters now because grid limits, lender scrutiny and demand for firm low-carbon supply punish a poorly chosen mix with curtailment, weak yields and stranded capital.

Which roles gain most from renewable and alternative energy technology selection?

Resource and yield engineers, project developers, generation planners, grid connection specialists and asset owners gain most. Mixed teams from utilities and power developers benefit further because engineering and commercial views meet on the same site evidence.

How does renewable and alternative energy technology selection differ from a grid protection course?

It focuses on choosing and sizing technologies before investment. A protection or relaying course deals with how built plant is protected and coordinated; here grid behaviour appears only as a screening factor for the selection decision.

What do you bring back from renewable and alternative energy technology selection?

You bring back a scored matrix for a real site, with resource evidence, storage and hydrogen options, connection screening and cost ranking. It gives your organisation a defensible basis for the next investment or planning decision.

Renewable and Alternative Energy Technology Selection: The Way Forward

The Technology Selection Matrix first informs which mix of solar, wind, storage or hydrogen to take into detailed feasibility. Developers use it with investment committees, planners with expansion studies and engineers with connection applications. After its first use, revisit the weights given to grid risk and storage duration, since network conditions and equipment costs move faster than resource data.